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Health-based risk neutralization in private disability insurance

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Background: Exclusions are used by insurers to neutralize higher than average risks of sickness absence (SA). However, differentiating risk groups according to one's medical situation can be seen as discrimination against people with health problems in violation of a 2006 United Nations convention. The objective of this study is to investigate whether the risk of SA of insured persons with exclusions added to their insurance contract differs from the risk of persons without exclusions. **Methods:** A dynamic cohort of 15 632 applicants for private disability insurance at a company insuring only college and university educated self-employed in the Netherlands. Mean follow-up was 8.94 years. Duration and number of SA periods were derived from insurance data to calculate the hazard of SA periods and of recurrence of SA periods. **Results:** Self-employed with an exclusion added to their insurance policy experienced a higher hazard of one or more periods of SA and on average more SA days than self-employed without an exclusion. **Conclusion:** Persons with an exclusion had a higher risk of SA than persons without an exclusion. The question to what extent an individual should benefit from being less vulnerable to disease and SA must be addressed in a larger societal context, taking other aspects of health inequality and solidarity into account as well.

Introduction

In modern society, insurers provide a valuable social function in shifting, spreading and reducing risks.¹ Therefore, accessibility and affordability of insurance are of great importance. Over the past years, private insurance companies have been met with growing criticism regarding risk selection practices, allegedly leading to unfair discrimination. Risk rating is thought to lead to discrimination of groups with chronic conditions.² A person's health is usually perceived as being influenced by a range of social and genetic factors, over which the person has limited or no control. Excluding people based on their health is seen as unethical by many.³ However, the fundamental rule that applies to all insurance products is that the premiums paid are appropriate to the risk of future claims.^{4,5} Thus risk classification based on medical underwriting lies at the core of most of these health-related voluntary insurance policies.⁶

Until now, most concern regarding risk stratification based on medical information has focused on life insurance and genetic information. However, other forms of insurance, e.g. disability insurance and risk factors other than genetic information such as past medical history are equally important and deserve just as much attention to prevent unfair discrimination.^{7,8}

When applying for private disability insurance, the risk of future claims is estimated by evaluating the current health status and the medical history of the applicant. Possible forms of risk management at application stage are a longer waiting period before a benefit is paid (longer deferment period), limited duration of the insurance

contract, extra premium or in case of an excessive risk even rejection of the insurance application. If a specific condition substantially increases the risk of claims being made, an exclusion can be added to neutralize this risk, i.e. the insured will not be entitled to a benefit if sickness absence (SA) is caused by the condition specified in the exclusion.^{4,9} Internationally, exclusions are a frequently used method of risk management in disability insurance.^{4,9} In a survey among Dutch self-employed 8% of those insured had an exclusion added to their insurance policy.¹⁰

Only two studies have attempted to evaluate this practice of risk neutralization. Wildhagen et al.¹¹ performed a case-control study in an exclusively male population comparing insured with and without exclusions. They found that insured without an exclusion claimed benefits less often than those with an exclusion. No significant difference in the length of the SA between those with and those without an exclusion was found.¹¹ Hamilton et al.¹² studied risk factors for insurance claims in a case-control study comparing claimants and non-claimants from a disability insurance company. In contrast to the findings of the previously mentioned study they found no relation between claims and exclusions.¹²

Thus knowledge regarding risk estimation and neutralization at application for private disability insurance is scarce, is based on limited evidence and is contradictory, leaving a considerable knowledge gap. The aim of this study is, therefore, to investigate whether the risk of SA of insured persons with exclusions added to their insurance contract differs from the risk of persons without exclusions.

Methods

Design and study population

This study is based on a dynamic cohort of 15 868 applicants for private disability insurance at a company insuring college and university educated self-employed, e.g. doctors, lawyers or dentists, in the Netherlands. All applicants who applied for a new insurance policy with a waiting period of 30 days before the insurance company starts paying benefits and were accepted for insurance cover between 1 January 1993 and 1 January 2010 were included. Only those applicants whose insurance contracts ran for at least 18 consecutive months were included. Applicants whose insurance contracts ran for <18 consecutive months were excluded from our study as follow-up would have been very short and it is doubtful whether persons leaving self-employment after a short period can be thought of as representative for the population of self-employed needing disability insurance.

Ethical clearance was sought from the Medical Ethics Committee of the University Medical Centre Groningen, which advised that, according to Dutch law, ethical approval was not required for this study. As administrative data was used, under Dutch law no informed consent was needed.

Study variables

The following data were collected retrospectively from the files at the insurance company: date of birth, profession, gender, the existence of one or more exclusions and the period during which the exclusion was in effect, the nature of the exclusion and information on periods of SA of 30 days or more.

Exclusions can be temporary, e.g. when accurate estimation of the risk at application is not possible. Especially when a health complaint has only recently emerged, often more time is needed to evaluate the course of this risk factor or illness. In these cases, the exclusions are combined with a right to re-assessment after a fixed period of time; most often 3 or 5 years. In general, these exclusions can be ended if at re-assessment the risk of SA due to the health complaint is estimated to be no higher than in the general population. Exclusions can also later be applied to the insurance policy if an applicant increases the amount insured during the follow-up time. A new risk assessment is then performed and for the additional amount insured an exclusion can be added.

The following groups were distinguished:

Group A: persons that had never had any exclusion added to their insurance policy during the follow-up period (reference group).

Group B: persons with one or more exclusions that ran during the whole follow-up period. We distinguished the following exclusion categories: mental and behavioural disorders, cardiovascular disorders, musculoskeletal disorders, pregnancy-related disorders other exclusions and 'multiple exclusions', i.e. more than one exclusion at the same time. When only one exclusion ran at the same time but during the study period exclusions from different disease categories followed each other, the exclusion that ran for the longest period was coded as the category for the whole period of exclusion.

Lastly, two groups were distinguished whose exclusions ran for part of the follow-up. In these cases, the first and the last date the exclusion was effective was extracted from the insurance company files.

Group C had an exclusion from the start that ended during the follow-up period.

Group D had an exclusion that was added to the insurance contract during the follow-up period.

Information was collected on the number of periods of SA, on the first and the last day of SA and on the causes of SA. As the shortest possible waiting period for the insurance company studied is 30 days, only periods of SA of 30 days or more were included in our study. SA was assessed in relation to the insured's own work by the insurance

company physician using medical information from treating physicians and self-report data. No distinction was made between partial and full SA. Length of SA was calculated from the number of calendar days an insured worker received a benefit. Full return to work in this study was defined as the end of the claim with the insurance company. Maternity leave for normal pregnancies was excluded, however, pregnancy-related SA was included. The following categories of diagnoses were distinguished: mental and behavioural disorders, cardiovascular disorders, musculoskeletal disorders, pregnancy-related disorders and other causes of SA. Data on SA periods were checked for inconsistencies and overlapping and directly consecutive periods were combined. In combined periods of SA, the cause that was the reason for most days of absence was coded as the cause of the total period. Follow-up ended when an insured person ended the insurance policy or on 1 July 2011.

Statistical analyses

To describe the sample characteristics, we calculated numbers and percentages for categorical variables and means, percentiles (pctl) and SD's for continuous variables in SPSS 19. The statistical package R3.01 was used to examine the hazard of SA periods and of recurrence of SA for the four different exclusion groups.¹³ In these analyses, the Andersen–Gill extension of the Cox proportional hazards model was used to allow for the recurrent nature of the event studied; here periods of SA.¹⁴

The four groups were then compared regarding the number of sick days using general linear models with resulting 95% confidence intervals (CIs) based on 1000 bootstrap samples. Analyses were conducted for all SA periods regardless of relation to the exclusion and for SA periods that were unrelated to the exclusion separately. Gender, occupation and age at the start of the follow-up were added to the statistical models to examine whether these variables could explain possible differences between the four groups.

Results

Descriptives of the sample

Table 1 presents demographic variables of the applicants included in our study in relation to the exclusions. A total of 15 632 insured persons contributed 139 786 person years to the study. Almost 60% of the sample were male and the mean age at the start of the follow-up was 35.09 years. The sample consisted of higher educated self-employed (legal professions, general practitioners, other medical doctors/specialists, dentists or orthodontists, paramedic professions, technical professions, financial services, pharmacists, veterinarians and midwives) (data not shown).

Of the sample, 12 997 applicants (83.1%) never had an exclusion added to the insurance contract (group A), and 1756 persons (11.2%) had an exclusion during the whole follow-up period (group B). The remainder of the sample ($N = 879$) had an exclusion that was in effect for part of the follow-up period, of which 422 (2.7%) had an exclusion from the start of their insurance contract that ended during the follow-up (group C) and 457 (2.9%) persons had an exclusion added to their insurance policy at a later stage (group D). In total, 5582 periods of SA occurred during the follow-up. Of these, 132 periods of SA were related to the exclusion present at that time. In our sample, 11 865 individuals experienced no SA.

Table 2 presents an overview of the different exclusion groups according to the nature of the exclusion in our sample. Exclusions for musculoskeletal disorders were most frequent in our sample but persons with exclusions for mental and behavioural disorders presented the highest number of sick days.

Tables 3 and 4 present the hazard ratios (HRs) for periods of SA and also the duration of SA in the different groups. Table 3 summarizes our findings for all periods of SA. Overall tests for periods ($P < 0.001$) and duration of SA ($P < 0.001$) showed statistically

Table 1 Descriptives of the sample $N = 15\,632$

	Total sample ($N = 15\,632$)	Group A	Group B	Group C	Group D
Gender: Men (N , %)	9304 (59.5%)	7804 (60.0%)	1027 (58.5%)	227 (53.8%)	246 (53.8%)
Mean age at start follow-up (SD)	35.09 (6.13)	35.03 (6.11)	35.97 (6.38)	35.05 (5.75)	33.40 (5.83)
Mean follow-up in years (SD)	8.94 (5.00)	8.87 (5.03)	8.10 (4.60)	11.35 (4.35)	11.95 (4.43)
0 SA periods (N)		10 036 (77.2%)	1305 (74.3%)	270 (64.0%)	254 (55.6%)
1 SA period (N)		2054 (15.8%)	312 (17.8%)	105 (24.9%)	117 (25.6%)
2 SA periods (N)		595 (4.6%)	90 (5.1%)	28 (6.6%)	50 (10.9%)
3 SA periods (N)		206 (1.6%)	31 (1.8%)	13 (3.1%)	21 (4.6%)
4 or more SA periods (N)		106 (0.8%)	18 (1.0%)	6 (1.4%)	15 (3.3%)
Total		12 997 (100%)	1756 (100%)	422 (100%)	457 (100%)

Group A: never exclusion (reference group).

Group B: exclusion whole follow-up.

Group C: exclusion from start but ended.

Group D: exclusion added after start follow-up.

SA, absence; SD, standard deviation.

Table 2 Exclusion groups and exclusion categories and total number of SA periods

	N (%)	Group B	Group C	Group D	Mean SA (days)	95 pctl	99 pctl
Mental and behavioural disorders	299 (1.9%)	155 (8.8%)	104 (24.6%)	40 (8.8%)	299.17	2090.00	5289.00
Cardiovascular disorders	191 (1.2%)	114 (6.5%)	46 (10.9%)	31 (6.8%)	246.53	2164.80	4651.36
Musculoskeletal disorders	708 (4.5%)	494 (28.1%)	102 (24.2%)	112 (24.5%)	288.03	2118.10	4578.07
Pregnancy-related disorders	112 (0.7%)	69 (3.9%)	17 (4.0%)	26 (5.7%)	170.22	745.50	3984.95
Other exclusions	963 (6.2%)	653 (37.2%)	130 (30.8%)	180 (39.4%)	185.57	871.60	4272.76
Multiple exclusions	362 (2.3%)	271 (15.4%)	23 (5.5%)	68 (14.9%)	246.38	1919.70	4180.35
Total		1756 (100%)	422 (100%)	457 (100%)	183.57	941.00	4076.68

Group A: never exclusion (reference group).

Group B: exclusion whole follow-up.

Group C: exclusion from start but ended.

Group D: exclusion added after start follow-up.

Table 3 Hazard rates and total duration of SA for all SA periods

All SA	HR all SA	95% CI	HR all SA	95% CI
	Unadjusted*		Adjusted ^{a,*}	
Group A	1		1	
Group B	1.29	1.19–1.40	1.18	1.08–1.28
Group C	1.26	1.10–1.44	1.22	1.07–1.40
Group D	1.65	1.48–1.84	1.57	1.41–1.76
	Duration all SA	95% CI	Duration all SA	95% CI
	Unadjusted*		Adjusted**	
Group A	174.95	164.33–186.57	307.17	270.44–341.06
Group B	245.74	211.78–279.81	338.99	294.74–383.94
Group C	213.15	133.46–299.29	343.29	262.24–431.70
Group D	162.73	104.33–229.10	323.11	258.22–396.36

Group A: never exclusion (reference group).

Group B: exclusion whole follow-up.

Group C: exclusion from start but ended.

Group D: exclusion added after start follow-up.

SA, sickness absence; CI, confidence interval. ^aAdjusted for gender, occupation, age at start follow-up. *Overall P values < 0.001. **Overall P values = 0.150.

significant differences between the four groups. Persons with an exclusion during the entire follow-up period presented a statistically significantly higher hazard of SA compared with persons without an exclusion (HR = 1.29; 95% CI: 1.19–1.40). The insured persons who had an exclusion that ended during follow-up showed a similar hazard while the persons who had an exclusion added to their insurance contract during the follow-up period showed a somewhat higher hazard (HR = 1.65; 95% CI: 1.48–1.84). The groups with

exclusions also had a longer duration of SA than the group without exclusions (only statistically significant between group A and B), except for the group that had an exclusion added after the start of the study. For SA unrelated to the exclusion similar but somewhat attenuated associations were found. Potential explanatory factors (gender, occupation and age at start follow-up) explained only part of the associations between the exclusions and the occurrence of SA.

Table 4 Hazard rates and total duration of SA for SA periods unrelated to the exclusions only

SA unrelated to exclusion	HR SA unrelated		HR SA unrelated	
	Unadjusted*	95% CI	Adjusted ^{a,*}	95% CI
Group A	1		1	
Group B	1.17	1.08–1.28	1.09	1.00–1.18
Group C	1.15	1.00–1.33	1.13	0.98–1.30
Group D	1.44	1.28–1.62	1.44	1.28–1.62
	Duration SA unrelated*		Duration SA unrelated**	
	Unadjusted	95% CI	Adjusted	95% CI
Group A	174.65	162.44–185.19	385.13	279.39–419.73
Group B	221.22	189.30–255.00	392.54	277.39–427.67
Group C	207.61	127.54–294.58	415.79	273.38–493.27
Group D	86.11	42.83–133.20	324.68	206.55–375.91

Group A: never exclusion (reference group).

Group B: exclusion whole follow-up.

Group C: exclusion from start but ended.

Group D: exclusion added after start follow-up.

SA, sickness absence; CI, confidence interval. ^aAdjusted for gender, occupation, age at start follow-up. *Overall *P* values < 0.001. **Overall *P* values = 0.124.

Discussion and conclusions

Main findings

In this study, we found that self-employed with an exclusion added to their insurance policy experienced a higher hazard of one or more periods of SA and on average more sick days than self-employed without an exclusion. This was found both for all SA periods and, albeit slightly weaker, for unrelated periods of SA. These findings indicate that persons with an exclusion added to their insurance policy have a higher than average risk of SA.

Strengths and limitations

One of the strengths of our study was the use of registers from an insurance company providing us with data on self-employed, a population that is otherwise difficult to study. Additionally the study relies on registered data on SA from insurance company files, thus avoiding recall-bias. As we only included SA periods of 30 days or longer, absenteeism caused by minor ailments is not included in our analysis, which has inflated median duration of all SA periods.

Regarding the limitations, there may have been underreporting of SA periods related to the exclusions in the groups that have an exclusion added to their insurance contract. Although the insured persons in our sample are obliged to report all SA periods, they may not have taken the trouble to do this when no benefit would be paid. However, the groups that with exclusion also experienced more and longer periods of SA in comparison to those who had never had an exclusion when absence unrelated to the exclusions was examined.

A final limitation relates to whether our study results are generalizable to other populations. Our study sample consisted of higher educated self-employed with a private disability policy only. Also, only clients from one insurance company were studied. Some caution must, therefore, be applied as to whether our findings are transferable to other populations and to other forms of insurance that rely on health-related risk selection.

Exclusions added to the insurance policy may be an indication of a generally poorer health leading to more and longer SA periods. Wildhagen et al.¹¹ found insured persons with exclusions to have more health complaints, both related and unrelated to the exclusions. Multimorbidity, the co-occurrence of more than one disease or condition, is common, even among working-age

individuals.¹⁵ The elevated risk of SA is probably not just caused by a single condition leading to an exclusion but related to the overall health status including complications of disease and to shared risk factors. We specifically analysed periods of SA that were unrelated to an exclusion present during that period to examine whether the higher risks could be caused by the specific condition that led to the exclusion. In these analyses, it was still found that persons with an exclusion had a higher hazard for experiencing a new period of SA and had on average more sick days. This indicates that the exclusions do not fully neutralize the elevated risk of SA.

Data on the two groups whose exclusions ran for part of the follow-up were also analysed (group C and group D). These groups had a higher hazard of SA than the reference group (A) but other results regarding these groups are difficult to interpret, possibly because of distinct selection mechanisms as exclusions can only be added to additional insurance policies and not to existing policies.

Our results differ from Hamilton's findings¹² but are in part in keeping with Wildhagen's study.¹¹ In addition to Wildhagen's finding that there was a higher risk of experiencing SA periods, we also found the SA periods to be longer in duration. Our additional findings may be caused by our larger sample and the greater detail in which we studied SA and exclusions. Also our design differed from these two case-control studies that may have been more affected by confounding or selection bias.

Another possible explanation for the higher hazard of periods of SA could be the scarring effect of previous SA periods as is described for depressive episodes.¹⁶ Conditions causing previous SA periods may lead to exclusions but the experience of SA itself regardless of the cause may increase the hazard of SA too. This may explain our finding of the highest hazard of SA periods for the group that had an exclusion added after start follow-up (D). Vulnerability of these persons is relevant for the risk evaluation by insurance companies.

Solidarity is an important aspect of insurance. However, the question in what way the costs of the insurance have to be shared is more difficult to answer. The basic principle that underlies all insurance products is that premiums paid are proportional to the risk of a future claim.⁴

Insurance can lead to solidarity but also to inequality and exclusion.³ Differentiating risk groups according to their medical situation can also be seen as discrimination. The United Nations

General Assembly adopted a convention on this issue in 2006. In this convention, it is stated that persons with health problems are entitled to the full spectrum of human rights and fundamental freedoms, including access to financial services such as insurance, without discrimination.¹⁷ The European Commission has given this subject attention as well, with a proposed Directive to limit the use of risk factors related to disability, and in particular to a disability's underlying health condition, in insurance and other financial services.¹⁸

The use of exclusions affects the extent of insurance coverage for a subgroup of insured self-employed. The results from our study indicate that although persons with risk factors and health conditions that lead to exclusions individually may feel discriminated against, this system still allows for a certain solidarity with persons in poorer health. Persons with an exclusion had a higher hazard of new periods of SA and more sick days, also for SA unrelated to the exclusion. Greater solidarity between the different risk groups could improve accessibility of disability insurance but may also lead to higher overall premiums.

Conclusions

The results of this study show that the SA risk of insured persons with exclusions added to their insurance contract is higher than the risk of those without exclusions. This was found both for all periods of SA and for SA unrelated to the exclusions. The question to what extent an individual should benefit from being less vulnerable to disease and SA must be addressed in a larger societal context, taking other aspects of health inequality and solidarity into account as well.

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Conflicts of interest: E.C.W. works at Movir, the insurance company that provided the data. No additional funding was received and Movir had no involvement regarding analysis and interpretation of the data, writing the article or in the decision to submit the article for publication; there are no other relationships or activities that could appear to have influenced the submitted work.

Key points

- Exclusions are used by insurers to neutralize higher than average risks of SA.
- Differentiating risk groups according to one's medical situation can be seen as discrimination against people with health conditions.
- The SA risk of insured persons with exclusions added to their insurance contract is higher than the risk of those without exclusions.

- The question to what extent an individual should benefit from being less vulnerable to disease and SA must be addressed in a larger societal context, taking other aspects of health inequality and solidarity into account as well.

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Sickness allowance trajectories preceding disability retirement: a register-based retrospective study

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Objectives: To identify subgroups of disability retirees with different pre-retirement sickness allowance histories and to examine whether the diagnosis of disability pension and socio-demographic variables discriminate these subgroups. **Methods:** The data included all Finnish residents aged 30–64 years who were granted a full disability pension in 2011 ($N=17\,208$). Sickness allowance trajectories during the preceding 10 years were searched using latent trajectory analysis. Multinomial logistic regression analysis was used to explore determinants of the trajectories. **Results:** Six distinct sickness allowance trajectories were identified. Four large subgroups with a long sickness allowance period during the final pre-retirement year were found, characterized by increasing (29% of retirees), early high (21%), stable low (24%) or stable high (16%) sickness allowance histories. In addition, two small subgroups (6 and 4%) with only a little sickness allowance during the final year were identified. The diagnosis of disability pension strongly influenced assignment to the trajectory groups. Women were more likely to have followed the stable high or the early high sickness allowance trajectory. Older age strongly increased but being a lower non-manual employee or self-employed decreased the probability of belonging to the two small trajectory groups. Long-term unemployment slightly increased belonging to the stable low trajectory and was strongly associated with the small subgroups with little or no sickness allowance during the final year preceding retirement. **Conclusions:** Different pre-retirement sickness allowance trajectories can be found. Assignment to the trajectories differed by the diagnosis of disability pension but associations with socio-demographic variables were weak.

Introduction

In most developed countries, disability benefits constitute of sickness allowance that compensates for short-term work disability and disability pension granted after longer or permanent work incapacity.¹ Most of those who retire due to disability first receive sickness allowance. This is the case also in Finland, where disability pension is normally granted after a sickness allowance period lasting 1 year.² However, the receipt of sickness allowance predicts disability retirement also on longer term.^{3–10} Longer length of sickness allowance increases the risk of disability retirement and the strength of the association also varies by diagnosis of sickness allowance and socio-demographic variables.^{7–9} Yet, little is known about the development of sickness allowance histories before disability retirement. On average, sickness allowance days increase when disability retirement approaches^{11,12} but there may be different subgroups that do not follow a similar pattern. The aim of this study was to identify subgroups of disability retirees with different pre-retirement sickness allowance trajectories and to examine whether the diagnosis of the disability pension and socio-demographic variables discriminate these trajectories.

Methods

The data included all Finnish residents who had been granted a new full-time disability pension in 2011, identified from the registers of the Social Insurance Institution of Finland (flat-rate national pensions) and the Finnish Centre for Pensions (earnings-related pensions). To permit sufficient time for tracing back the pre-retirement sickness allowance histories, those younger than 30 years were excluded. The data thus included 17 208 disability retirees.

Sickness allowance

Data on sickness allowance were based on the register of the Social Insurance Institution. The register includes all sickness allowance periods that exceed a waiting period which normally consists of 10 working days. For those who have not been engaged in any gainful activities during the preceding 3 months, the waiting period is 55 days.¹³ The number of sickness allowance days was examined in 1-year (365 days) intervals counting backwards from the start of the pension. The length of each sickness allowance period was calculated as the difference between the last and the first allowance day.

Covariates

The primary diagnosis of the disability pension was classified into eight groups based on the ICD-10 classification. The categories were depression (F32–F33), other mental and behavioural disorders (other illnesses in Chapter F), back problems (M40–M54), other musculoskeletal disorders (other illnesses in Chapter M), diseases of the circulatory system (I00–I99), neoplasms (C00–D48), diseases of the nervous system (G00–G99), injury (S00–T98) and all other illnesses.

Age at the end of 2010 was classified into 30–44, 45–54 and 55–64 years. Educational level was derived from Statistics Finland and classified into those with primary education, lower-secondary, upper-secondary and tertiary education. Social class was derived by first separating wage earners and self-employed based on the type of their employment insurance. Wage earners were then classified into manual workers, lower non-manual employees and upper non-manual employees.¹⁴ Unemployment history was classified into <90 days, more than 90 days and entire year during any 1-year interval during the preceding 6 years.